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ABSTRACT

First and third grade children's ability to coordinate reading and listening was studied using a "mismatch detection" task. A total of 15 first grade children and 15 third grade children of average to below average reading ability read printed texts while listening to recordings of the same texts, in which extraneous spoken words were occasionally substituted for words appearing on the page. The children were instructed to signal each time they detected a mismatch between what they were reading and what they heard. The data indicated that even the first graders had little difficulty simultaneously extracting information from aural and printed versions of texts recorded at rates slower than that of typical "read-along" tape recordings, but that children in both grades performed poorly at typical "read-along" rates. The results suggest that many primary school children might have difficulty reading along with the audiotapes of books and stories currently available for instructional use. (Author/GT)

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Development of Skill in Reading-while-Listening[1]

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Simultaneous reading-and-listening is a skill which has been taken for granted for centuries. Thousands of teachers have instructed children of all ages to "follow along in the book" while someone else reads. This method of reading along silently while listening to the text was recommended in the 1600's by Comenius (1657). It has been criticized in recent years (e.g., Durrell, 1956), but is still in widespread use in reading instruction. In addition to the "round robin" approach, in which children take turns reading aloud, a new type of reading-along is gaining popularity. The newer method involves reading along silently with an oral rendition of a book or story, recorded on a cassette tape or phonograph record by a fluent reader. Both types of instruction assume that children readily combine whatever reading and listening skills they have. But there has been almost no investigation of the nature or extent of children's ability to read and listen at the same time. The research I shall describe is an initial study of children's skills in combining reading and listening.

My experiments have focused on reading while listening to cassette tapes. In 1978, Mary Monteith reported that cassette tapes have become a part of the core of materials relied on by reading instructors. She described a survey in which 88% of a

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large sample of school administrators reported use of book-cassette combinations in their schools. These "read-along" packages are promoted, in part, as a means of improving silent reading fluency. Although the method is widely used, there is very little evidence to support the claim that practice in reading-while-listening improves reading skill. A few studies (for example: Neville and Pugh, 1974; and Schneeberg, 1977) indicate that extended practice in reading-along with audio tapes improves scores on reading achievement tests. But overall, the findings on this question are contradictory and difficult to interpret, partly because the nature of reading-while-listening is poorly understood, and the extent of children's skill in reading-while-listening is unknown. Knowledge about the development of reading-while-listening skills would be helpful in assessing the potential usefulness of the read-along technique in reading instruction.

What skills are involved in reading-while-listening? The child must certainly draw on basic reading skills and listening skills, adapting them for combined use. One might ask, for instance, how the reading involved in reading-while-listening differs from other kinds of reading. The set of questions I have set out to address focuses on the process of <u>combining</u> or <u>coordinating</u> the two activities. Reading-while-listening demands active coordination. The aural message proceeds at its own pace. If you do not adjust your reading to correspond with what you hear, then the two activities become mutually distracting. So coordination is central to reading while listening.

A basic question, then, is the following: how well can beginning readers coordinate reading and listening, and how does this skill change with development? Do young children have difficulty attending to the two sources at once? Are they able to adjust their reading to a relatively fast pace? How much information can they pick up from the printed page while listening and reacting to fluctuations in rate? These questions have direct bearing on the usefulness of "read-along" tapes for instruction, since the reading practice that a child gets in using the tapes depends on level of skill, in other words, on what the child is able to do when using the tape.

The present experiment was conducted to obtain basic information about first and third grade children's ability to coordinate reading and listening. The first step was to establish that beginning readers can extract information from both the aural and visual sources in a coordinated manner. A second question was whether this ability can be applied when the oral reading moves more rapidly than the child normally reads. The effect of rate is of practical import because the "read-along" tapes purchased by schools involve fairly rapid reading.

A task was devised to assess ability to pick up information from the two messages in temporal coordination. The child reads along with a tape recording which contains occasional "mistakes". The mistakes are discrepancies between the aural and visual versions. They are produced by substituting an extraneous spoken word for one appearing on the page. The child is told that the

voice on the tape sometimes says a word different from the word on the page, and is asked to signal to the experimenter when this occurs. Detection of the mismatched words indicates that the child is attending to both the tape and the written story, selecting information from the two sources in coordination.

It was expected that even very young readers would display some skill in reading-while-listening. Coordinated looking and listening begins in infancy, so even the beginning reader has years of experience which should provide some basis for combining the activities. It seemed unlikely, however, that beginners would be flexible in applying their skills at different rates. Neville (1975) demonstrated an effect of rate on comprehension in reading-while-listening. She found that middle school children's comprehension of text decreased as rate of reading-while-listening increased. In the present study the effect of rate was assessed by testing each child at three reading rates. A slow rate — the child's own oral reading rate — was used as a sensitive measure of skill in reading-while-listening.

Faster reading rates were used to determine how skillful children are at adjusting their reading to spoken messages that exceed their own oral rates. In particular, the fastest rates were those representing the "read-along" tapes used in schools. These rates were derived from samples of published reading-while-listening materials used by primary school children. Performance at the "read-along" rate should help clarify the potential usefulness of comercially available tapes, for developing reading skills.

First grade children, who are relatively inflexible in their reading rates, were expected to have difficulty performing the "mismatch" task at the read-along rate.

It seemed likely that children who could not read while listening at the read-along rate might still succeed at rates faster than their oral rates. An intermediate rate was used to test this possibility.

Performance on the mismatch task, that is, the proportion of aural/visual discrepancies detected, reflects a subject's ability to coordinate reading and listening at a given rate of presentation. This measure indicates degree of skill in reading-while-listening. We would also like to know how reading and listening are combined, and how reading-while-listening skills develop throughout grade school. One question concerning developmental changes in reading-while-listening was addressed here. The question is whether a child samples the text uniformly, attending to every word, or concentrates on the more important portions of text. Data on how subjects sampled the text were obtained by varying the type of words used in forming the aural/visual discrepancies, that is, the mismatch items. Two types of items were used. Half of the mismatches occurred on "content" words such as nouns and verbs. The other half involved "function" words such as articles and prepositions, which tend to be less informative (Schindler, 1979). A difference in detection rates between the two types would indicate selective attention based on informativeness (to the extent that informativeness is reflected in the type, or form class of the words used). Since reading becomes more economical

as skill develops (Gibson and Levin, 1975), the tendency to sample the text selectively should be stronger in older readers than in beginners, if children apply their basic reading skills in reading-while-listening. It was hypothesized that third graders, more than first graders, are likely to notice discrepancies involving content words, in comparison with those involving function words.

In summary, both first and third grade children were expected to display ability to coordinate reading and listening. It was predicted that reading-while-listening performance would be adversely affected by increases in reading rate, and that third grade performance would be characterized by selective sampling of text, reflected as an effect of form class.

Method

Subjects

The subjects were 15 third grade children and 15 first grade children of average to below average reading ability. None of the children had been involved in programs using read-alongs on a regular basis.

Materials

Three stories of appropriate difficulty were chosen for each grade. The selections were recommended by school librarians, and abridged by the experimenter. A set of items for the mismatch task was constructed for each story. An item involved two words — one in the printed text, and the word substituted for it in the aural version. Both words in a given item were either function words (like prepositions and conjunctions) or content words (like

nouns and verbs). Items were embedded in sentences throughout a story, occurring in various grammatical contexts. In each case both the printed word and the aurally presented word made sense in the context. There were 12 items in each first grade story, 20 in each third grade story. An additional, practice item occurred at the beginning of each story. The order of items in a story was the same for all subjects, and was unsystematic with respect to the type of item.

Written versions of the stories were typed using 3-4 pages per story. In addition to the stories, two very short passages were prepared for each grade level, as practice materials.

The experimenter tape recorded each story at various rates. The selections were read with natural phrasing and intonation, even when very slow rates were required. For each subject, a tape was made to match the individual child's reading rate. A second tape represented the rates characteristic of "read-along" tapes found in school libraries, and a third provided an intermediate rate.

The oral reading rate was used to provide a sensitive measure of skill. Each child's oral rate was assessed in classroom observation, during which children took turns reading aloud. The oral rates ranged from 18-50 words per minute among first graders and from 50-91 words per minute for third graders. For each child, one of the stories was recorded at a rate within three words per minute of his observed oral rate.

The read-along rate was based on a sample of read-along kits

found in two elementary school learning centers. School librarians were asked to point out which of their reading-while-listening materials were used by first grade and by third grade children. A number of these were then selected at random, and words per minute were counted for several pages from each story. At each grade level, the mean of these rates was used as a "read-along" rate for all subjects. Thus, each story was tape recorded at a rate within three words per minute of the appropriate read-along rate: first grade — 112 words per minute, third grade — 141 words per minute.

The intermediate rate for each child was 35% faster than the child's oral rate. These tape recordings were made specifically for individual children.

Procedure

Each child was seen individually for one or two half-hour sessions. Children were told that they would hear a story, and were asked to read along with the voice as they did in the learning center, or in their oral reading lesson. They were told that the voice on the tape sometimes said a word different from the word on the typed page. After finding a few mismatches in a practice selection, a subject was given a tablespoon and asked to tap on the desktop whenever he noticed such a mistake. The child practiced briefly and then did the task, proceeding from the slowest story to the fastest. A subject read each of the three stories at a different rate, but the assignment of rates to stories was counterbalanced across subjects. Thus, each story was read at a given rate (oral, read-along, or intermediate) by five subjects. The experimenter marked responses on a copy of the text, as they occurred.

Findings

The children understood the task readily, and seemed to enjoy it. First graders were particularly enthusiastic. They responded to the items with vigorous pounding, and occasional knowing smiles.

The tapping responses were prompt, usually occurring within a second or two of the occurrence of a mismatch item. Only responses which followed an item closely were considered successful detections. Taps occurring between items were classified as false positives; about 15% of the responses were false positives.

The dependent variable of interest is the proportion of mismatch items detected. Figure 1 shows the proportion of items detected by first and third graders at each of the three rates. Overall, performance was good. Even the younger children detected about two-thirds of the discrepancies at their own oral reading rates. First graders, as well as third graders, were able to adjust their reading to what was heard. In addition, all children showed some evidence of ability to pick up enough information from both sources to determine when the messages diverged. Basic skill in coordination of reading and listening is thus established in first grade.

A repeated measures analysis of variance was used to test the effects of reading rate and form class on proportion of items detected. Detection of mismatches decreased significantly with increases in reading rate. The grade x rate interaction was not significant, but there were some differences between the grades in the effects of rate. Both groups performed reasonably well

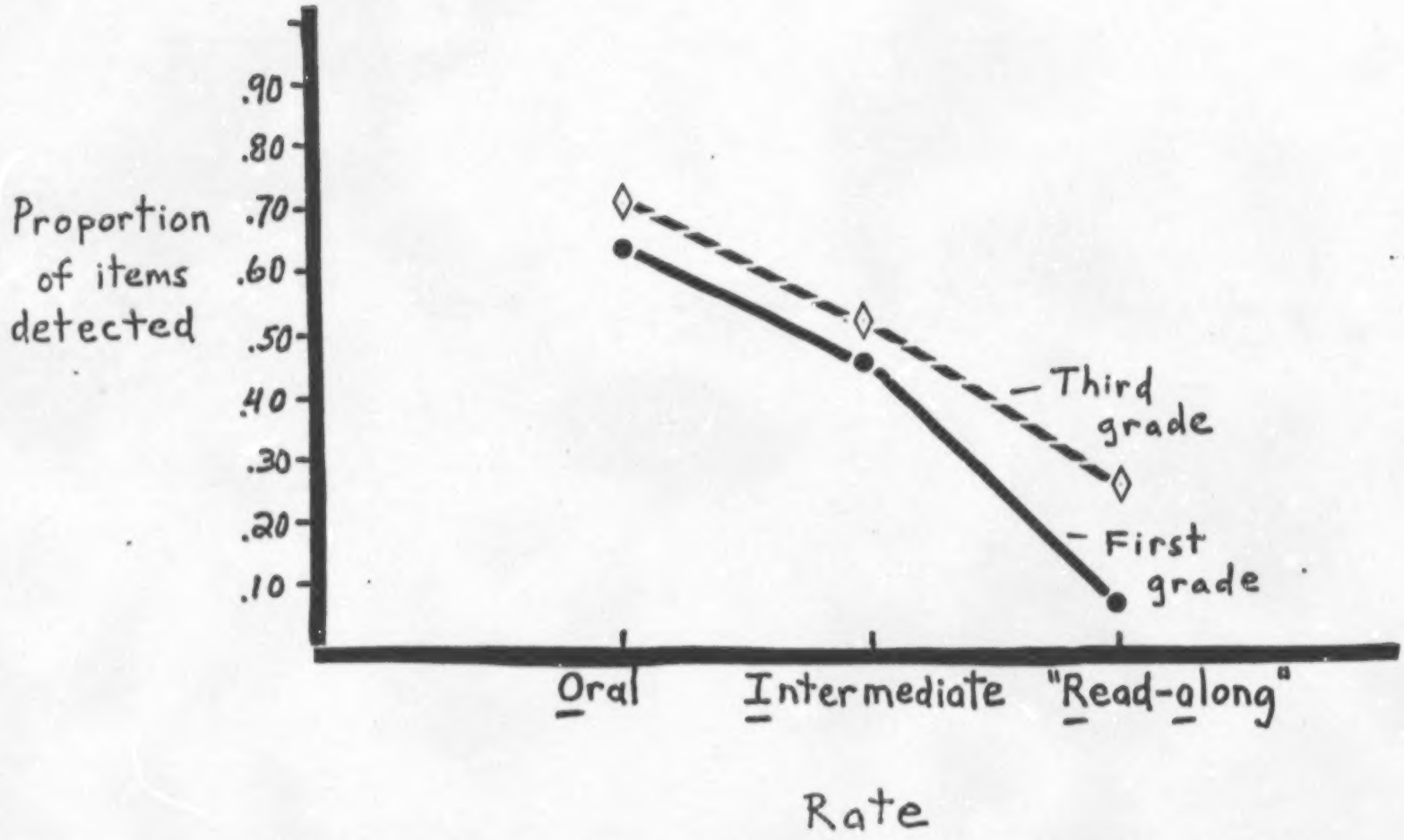

Figure 1. Proportion of items detected by first and third grade children at each of the three rates.

when reading 35% faster than their own oral rates. The data suggest, however, that first graders cannot combine reading and listening at rates typical of "read-along" tape recordings. Over half of the first gradres failed to detect a single item in this condition, and only two detected more than one discrepancy. Several remarked that the tape was too fast. First graders often appeared to be reading several lines behind the voice with these tapes.

Third grade performance was mixed. A few subjects performed well at the "read-along" rate. Six detected only one or two items, like the first graders. The rest performed poorly but showed some evidence of coordinated information pick-up. In general, the skill observed at slower rates seems to break down at the read-along rate, for both grade levels. These findings suggest that a substantial number of primary school children would have difficulty in reading along with a typical taped story.

Figure 2 shows the effect of form class, that is, content-word items vs. function-word items. The items involving content words were detected more frequently than those involving function words. Form class, furthermore, interacted significantly with grade level. As expected, there was a strong tendency among the older children, but not the younger, to notice more mismatches on content words. More experienced readers sample the text more economically than beginners when they read while listening. A question for research is whether the tendency to attend more closely to content words is influenced by characteristics of the aural presentation such as phrasing and intonation.

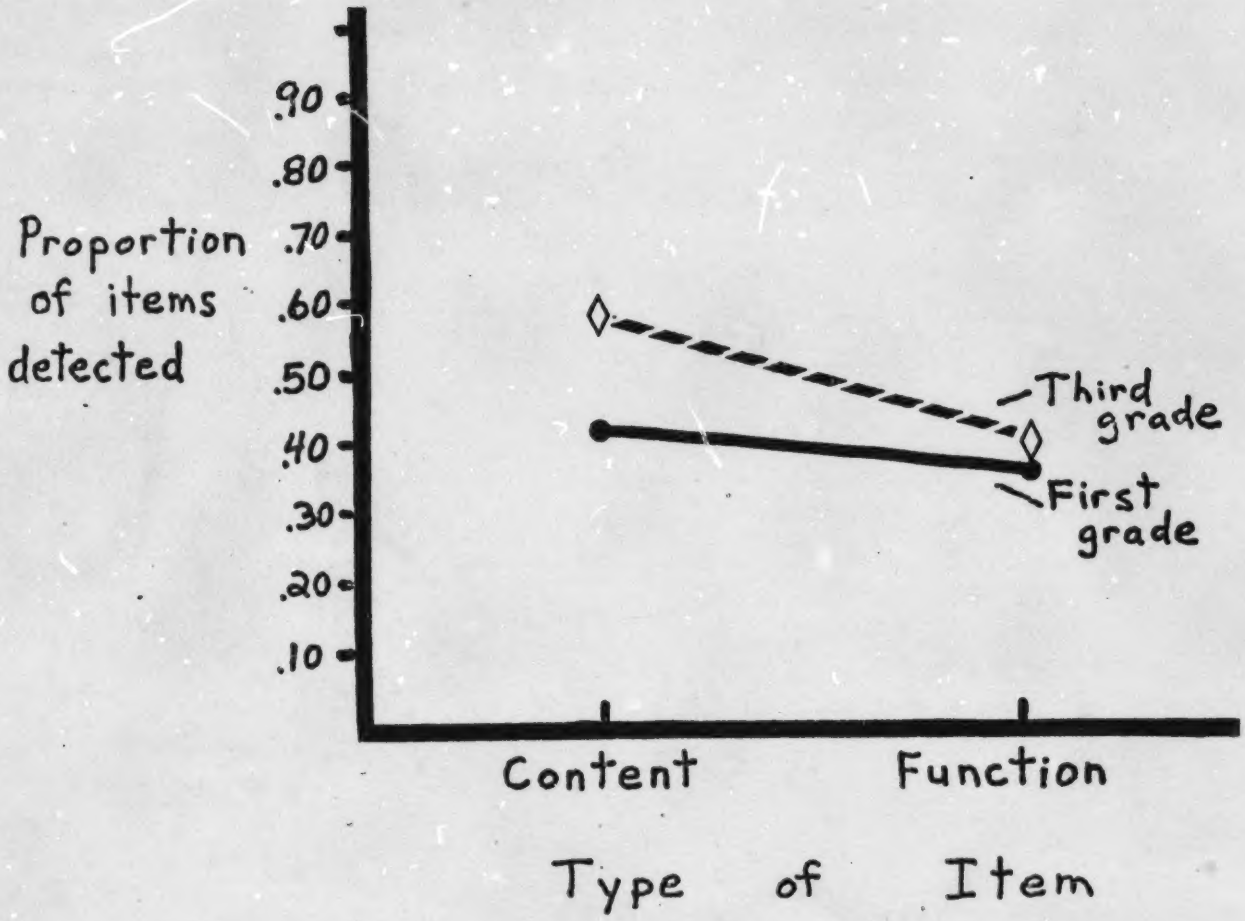

Figure 2. Proportion of items detected by first and third grade children, as a function of form class.

Figure 3 shows the content/function effect by grade and reading rate. The content/function differences are significant at all three reading rates for third graders, but at none for first graders. Form class did not interact significantly with rate at either grade level.

In sum, the main effects of rate and form class were statistically significant, and a significant interaction between grade and form class was observed.

This initial work on reading-while-listening shows that children are able to read and listen simultaneously from as early as first grade. Even beginning readers have little difficulty extracting information from aural and printed versions of text at once. Their flexibility in applying these skills, however, is quite limited with respect to rate. The older children showed proficiency at rates far exceeding those of the younger ones. Thus, between first and third grade children learn to adjust reading activity to a wider range of read-along rates. Improvement in skills specific to reading-while-listening may be involved, but the facility of the older children might be due simply to their ability to read faster.

Performance at read-along rates gives us an idea of how well reading-while-listening materials (intended for primary school use) match the skills of young readers. The first graders were consistently unable to perform the mismatch task at the read-along rate. When reading speeds were well beyond their oral rates they

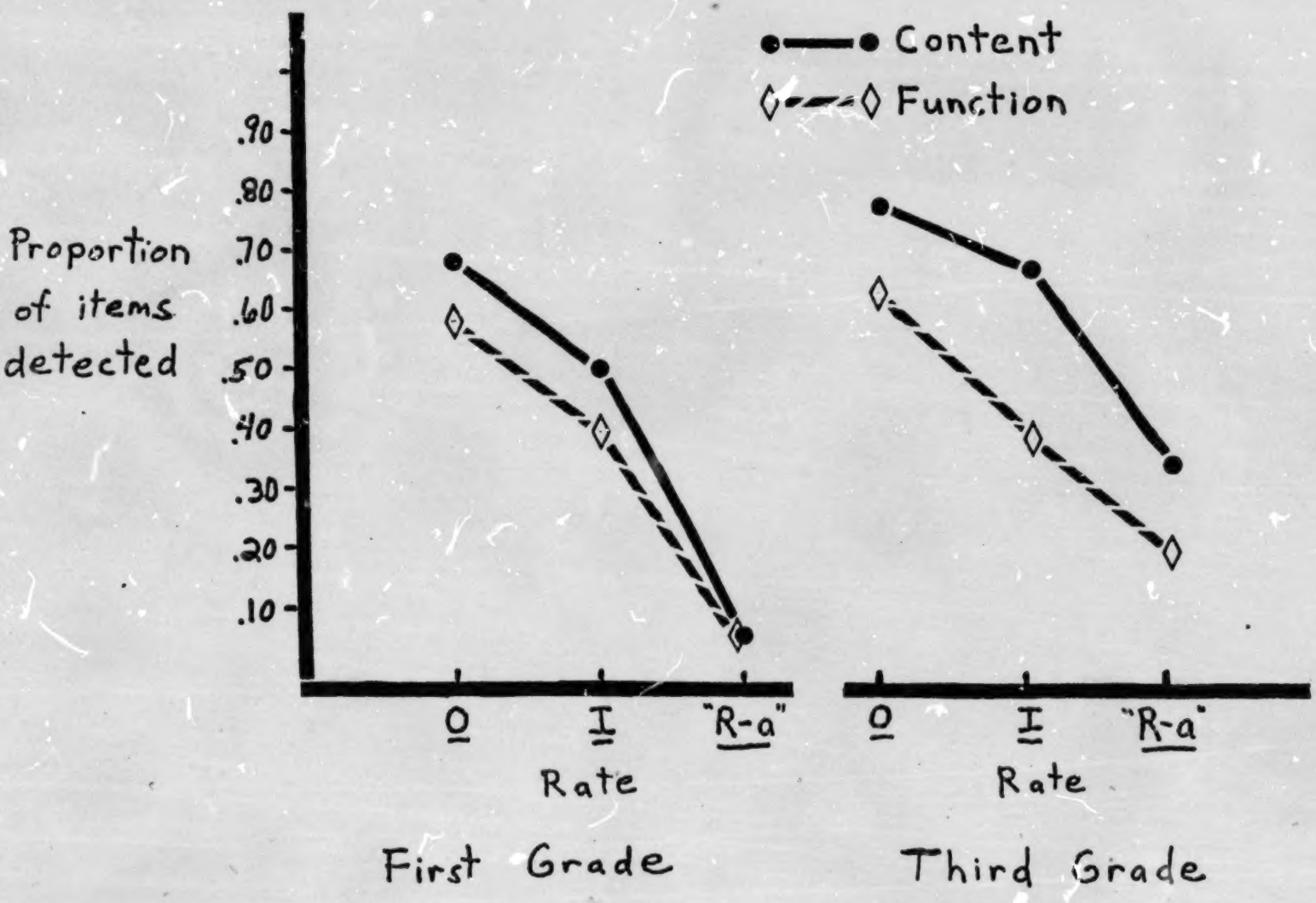

Figure 3. Proportion of items detected by first and third grade children as a function of rate and form class.

clearly could not apply the reading-while-listening skills demonstrated with slower tapes.

This finding calls for an examination of the appropriateness of currently available read-along tapes for beginning readers. If these materials are to be used for combined reading and listening, as opposed to just listening, then they would be more useful if recorded at slower reading rates, rates which would permit the reader to pick up information from voice and print in coordination. An optimal rate for reading-while listening cannot be specified. Facility in reading-along might be markedly increased by repetition of a particular selection. The skills of first graders, furthermore, vary considerably, even within the average-below average population sampled here. Intermediate rates would probably be preferable to children's oral rates, because the oral rates are often too slow to be enjoyable.

In general, the demands of the mismatch task exceed those of normal reading-while-listening, in which a child is not called upon to make any overt response. The data reported here may thus tend to underestimate ability to coordinate reading and listening. For more precise knowledge of the effects of rate on reading-while-listening, we need to observe children reading-along naturally, without an added task. Eye movement recording might be useful in this regard.

The mixed performance of the older children suggests that many third grade children have not acquired the facility in reading-while-listening demanded by the read-along materials they

are likely to encounter. Again, it does not follow directly that substantially slower recordings should be provided. The appropriate rate will depend on factors such as frequency of repetition and difficulty of text, as well as the purpose of reading with a tape. A very slow rate, for instance, would permit practice in complete decoding, whereas a rapid rate would not, but might encourage a tendency toward economical sampling of text. Research is needed which tests the effectiveness of different rates of reading-while-listening in influencing a specific skill or aspect of reading behavior.

Lack of knowledge about reading-while-listening makes it difficult, at present, to predict what reading skills it might affect. We need to study the nature of this dual activity, and how it changes as readers mature. One such change was observed here — a developmental trend toward selectivity in reading/listening. As expected, discrepancies involving the more informative content words were detected at a higher rate than those involving function words. The effect was greater for the older children. Reading-while-listening thus tends to become more economical over the years, as do silent and oral reading (Levin, 1979). We do not know whether this change involves development of skills specific to reading-while-listening. One possibility is that the older children have learned to pay closer attention to features of the recording such as phrasing and intonation, which might influence selectivity.

A question of great interest is whether an individual engaged in reading-while-listening reads any more or less efficiently

than in reading alone, either silently or orally. Gilbert (1940) showed a decrease in efficiency of eye movements when children followed the oral reading of classmates less skillful than themselves. The use of taped read-alongs assumes that following with a skillful rendition, which reflects masterful, economical reading, will enhance efficiency. The notion is that the child, in adjusting his reading activity to the fluent reading he hears, reads more economically himself. If this were the case, then reading-while-listening might be expected to provide useful practice for fluency in reading. The question can be addressed through research which compares silent and oral reading to reading-while-listening on appropriate measures of reading skill.

To recapitulate, the findings of this study tell us that skill in combining reading and listening is established early, that flexibility in applying the skill at different rates increases through the primary grades, and that reading-while-listening becomes more selective or economical with reading experience. What specific skills are involved in learning to read while listening is a problem calling for research. The principle challenge in studying reading-while-listening will be in finding ways to observe children reading-along naturally, as they do in the library or classroom.

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